

## Chapter 17

# Using a Systems Thinking Perspective to Construct and Apply an Evaluation Approach of Technology-Based Information Systems

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### ABSTRACT

*In this article, we use soft systems methodology and complexity modeling to build an evaluation approach of a data warehouse implemented in a leading European financial institution. This approach consists in building a theoretical model to be used as a purposeful observation lens, producing a clear picture of the problematic situation under study and aimed at providing knowledge to prescribe corrective actions.*

### INTRODUCTION

In this article, we discuss a research approach constructed and applied to evaluate the performance and the multiple impacts of a corporate data warehouse implemented in a financial institution. The first section examines the epistemological and the methodological underpinnings of our approach based upon soft systems methodology and systemic modeling. We will especially focus on

the reasons why we have chosen a systemic view to build an evaluation approach of an information technology (IT)-based information system (IS). We will argue that pragmatic issues arising from the characteristics of the empirical field under investigation and/or the researcher status within this field can lead to seek an alternative to the positivist paradigm on one side and the interpretive paradigm on the other side. In the second section, we discuss the theoretical development

of our evaluation tool conceived as a structuring framework to investigate the field with special lenses, and also allowing the description of emergent and unpredictable events. The third section describes how this approach has been applied in an empirical research process conducted during a period of 17 months using multiple research techniques. Finally, results, limitations, implications, and recommendations for future research are presented.

### **SEEKING A METHODOLOGICAL APPROACH: TO MAKE SENSE, BUILD THE MODEL**

Since the Delone and McLean (1992) quest for a dependent variable to assess technology-based information systems (IS/IT) success, the evaluation of these systems, in terms of their intrinsic performance (technical or task-oriented), and/or impacts on individuals, groups, organizations, and societies is still a hot issue, generating much interest among a wide range of researchers, in management science, economics, sociology, computer science, and so forth.

This issue illustrates, in our opinion, the divergent and nevertheless complementary perspectives and points of view that characterize the information systems field. We believe that this diversity does not contribute to enhancing the identity crisis within this discipline (Benbasat & Zmud, 2003; Galliers, 2003) but helps researchers and practitioners to develop multiple evaluation tools and frameworks that can satisfy a multiplicity of requirements: technical, financial, productivity-oriented, behavioural, and so forth. The first step for a researcher or a practitioner involved in an evaluation process is to define the perspective that will be adopted. Such a choice obviously depends on his or her intentions, interests, and theoretical and professional background. It also depends on the objectives of the study being conducted: theory development, theory testing (empirical studies),

practical recommendations, corrective actions prescription (action research), and so forth.

The research study discussed in this article is related to an evaluation process conducted by a doctoral student in management information systems, who has been mandated by the chief information officer of a leading European financial institution to assess the performance of a corporate data warehouse (DW) implemented within this firm and to prescribe corrective actions in order to promote success and avoid failure. To cope with this task, combining scientific rigor, pertinent observation, objective assessment, and corrective actions, a research approach built upon systems thinking is iteratively developed, applied, and adjusted over time (Churchman, 1979). Theoretical work is not a prerequisite to enter the research field. Empirical and theoretical tasks are combined to help the researcher give meaning to what he or she observes and experiences (Avison, Lau, Myers, & Nielson, 1999; Avison, Baskerville, & Myers, 2001). This is what Checkland and Scholes (1990) call an *Organized Purposeful Action* defined as a “deliberate, decided, willed action, whether by an individual or by a group” (p. 1).

The dilemma here is that to produce purposeful action, the researcher cannot ignore the knowledge already accumulated. He is also willing to produce “new” experience-based knowledge. Now, where might the knowledge to guide action be found? The temptation is great to try an affiliation to the positivist research tradition (Hirschheim, 1992). Whereas the omnipresent social dimension of the IS field and the human intentions embedded in organized purposeful action, the constructivist and interpretivist research strategy seem to be more appropriate (Galliers, 1992).

Pragmatically, we adopt a systems thinking epistemology positioning that we will apply using pluralistic research techniques (qualitative and quantitative). As argued by many authors (Alter, 2004; Checkland, 1999; LeMoigne, 1977; Mora, Gelman, Cervantes, Mejía, & Weitzenfeld, 2002), using “systems” thinking in the informa-

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